A NEW SPECIES OF SNAIL FROM LAKE PEDDER, TASMANIA, POSSIBLY BELONGING TO THE FAMILY VALVATIDAE

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ABSTRACT

A new species of freshwater snail, *Valvata (?) pedderi* sp. nov. is described from Lake Pedder, Tasmania. It is tentatively referred to the Family Valvatidae and constitutes the second record of this family for Australia. The structure of the radula and the anatomy are described.

INTRODUCTION

During a survey of the Lake Pedder area of Southern Tasmania, several specimens of a minute gastropod were collected from weed in shallow water by Mr. A. J. Dartnall of the Tasmanian Museum. These were recognised as new to the fauna of Tasmania by Mr. R. C. Kershaw of the Queen Victoria Museum, Launceston, and passed on to me for description and further study. Subsequently, further specimens were obtained by Dr. P. Tyler of the University of Tasmania, which allowed anatomical studies to be carried out.

Notwithstanding the availability of about 10 specimens, these studies are still inconclusive with regard to family and generic placement of the species. This is due to the small size of the animal which makes anatomical study extremely difficult, and the lack of comparative material from the group concerned. However, it was decided that the species should be described and that such findings as have been made, should be recorded.

Abbreviations: TM — Tasmanian Museum; NMV — National Museum of Victoria.

FAMILY AND GENERIC PLACEMENT

The species has a thin, horny, almost colourless operculum with a central nucleus, and a very small, thin, planispiral shell with pronounced spiral ridges on the dorsal and ventral surfaces. The radula consists of a few large units with many denticles. All these characters suggest the Family Valvatidae. However this family is reported as confined to the northern hemisphere (Wenz, 1939; Fretter & Graham, 1962) with only one questionable record in South America (Wenz, 1939); also the radula differs from any other valvatids for which such information is known, possessing only a single large, multicuspid central tooth of a highly modified nature. Nevertheless, I am provisionally referring this species to the Family Valvatidae as it most closely approaches this family in many of its characters. I am also including it in the genus *Valvata* sensu lato because of the paucity of anatomical knowledge. The external characters of the living animal have not been recorded and the few animals which

have been dissected or sectioned all proved to be immature so that important features of the reproductive system could not be fully elucidated. Although the structure of the radula was readily seen and proved to be different from any other valvatid, it was thought that, because this could be a function of the animal's small size and because comparative radula information was not available for many of the existing valvatid genera, the erection of a new higher taxon on such evidence would be premature. It is proposed to continue this study in the near future.

Valvata (?) pedderi sp. nov.

Text figures 1-9.

Diagnosis: Shell (Figs. 1-5) dextral, minute, planispiral with sunken spire, whorls strongly keeled dorsally and ventrally, periphery rounded, 3 whorls, with faint growth lines visible, surface of shell composed of irregular lattice of crystal elements. Aperture oval, pointed dorsally and ventrally. Umbilicus wide and deep. Operculum very thin, horny, pale yellow, paucispiral with $1\frac{1}{2}$ turns and central nucleus. Radula of a large curved spoon-shaped central tooth bearing two rows of 7 denticles, lateral and marginal teeth absent. Eyes at outer base of tentacles, little or no modified ctenidial structure, reproductive aperture on right anterior side of head posterior to tentacles.

Type Material: Holotype in Tasmanian Museum, E8543, complete specimen with animal preserved in 70% alcohol.

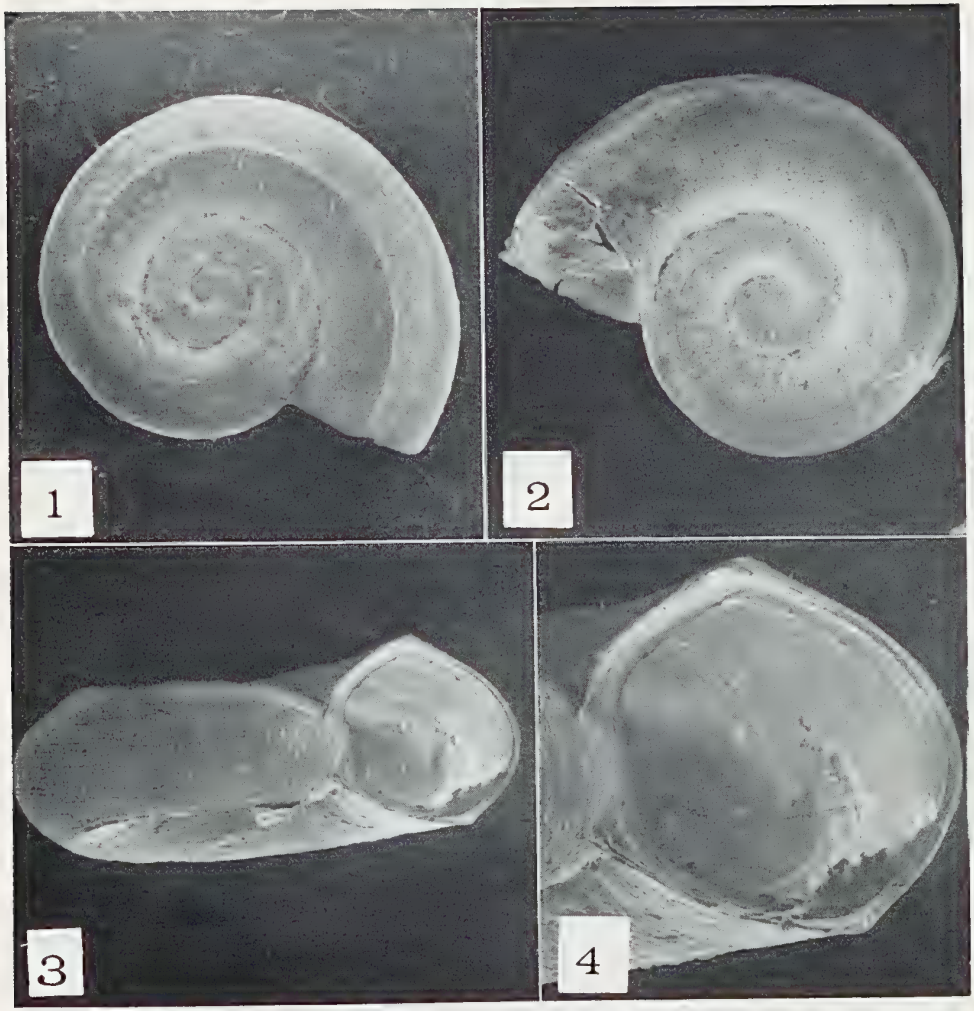
Seven paratypes: Paratypes 1 and 2 in Tasmanian Museum, E6443 with animals preserved in 70% alcohol. Paratype 3 in National Museum of Victoria, F27937, complete serial sections on three slides. Paratype 4 in Tasmanian Museum, E8544, shell only. Paratype 5 in National Museum of Victoria, F27938, shell only. Paratypes 6 and 7 in National Museum of Victoria, F27939, shells only mounted on SEM stud and coated with gold.

Dimensions:

Holotype	E 8543	Max. 1.96 mm.	Min. 1.61 mm.	H 0.88 mm.
Paratype 1	E 6443	Broken	Broken	Broken
Paratype 2	E 6443	1.23 mm.	1.00 mm.	0.42 mm.
Paratype 3	F 27937	———	———	———
Paratype 4	E 8544	1.23 mm.	1.00 mm.	0.58 mm.
Paratype 5	F 27938	1.11 mm.	0.85 mm.	0.58 mm.
Paratype 6	F 27939	1.35 mm.	1.04 mm.	———
Paratype 7	F 27939	1.65 mm.	1.31 mm.	———

Type Locality: Lake Pedder, Lake Maria and Lake Edgar, Southern Tasmania, now all part of the new Lake Pedder, enlarged artificially. The holotype was collected by J. L. Hickman in a small hole in the plain just south of Lake Edgar on 17 May, 1972. The remainder of the type series was collected by Mr. A. J. Dartnall in shallow water on weed and rushes with a net on 12 February, 1967.

Other Material: Lake Maria, A. J. Dartnall, 10 February, 1967, 3 spec. (TM); Lake Edgar, P. Tyler 17 May, 1972, 2 spec. (NMV).



Figures 1-4. *Valvata (?) pedderi* sp. nov.
1. Dorsal view of Paratype 6, F27939, X 90.
2. Ventral view of Paratype 7, F27939, X 90
3-4. Aperture views — specimen lost subsequently, 3 — X 93, 4 — 240.

Radula: The radula (Figs. 6-9) of one specimen was extracted by macerating in 10% sodium hydroxide. It was then mounted on a stud, evaporated with gold and examined with a J.S.M. U-3 Scanning Electron Microscope.

The radula consists of a ribbon of highly modified single central teeth with enlarged basal regions so that each tooth articulates in the plane of the ribbon with the teeth on either end of it. There are no lateral or marginal teeth. Each tooth consists of a solid base plate with short anteriorly pointing protuberances which appear to form ball-and-socket-

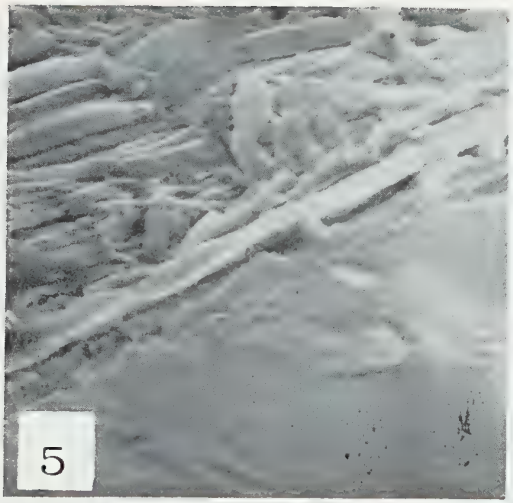


Figure 5. *Valvata (?) pedderi* sp. nov.
Surface of shell, X 2850

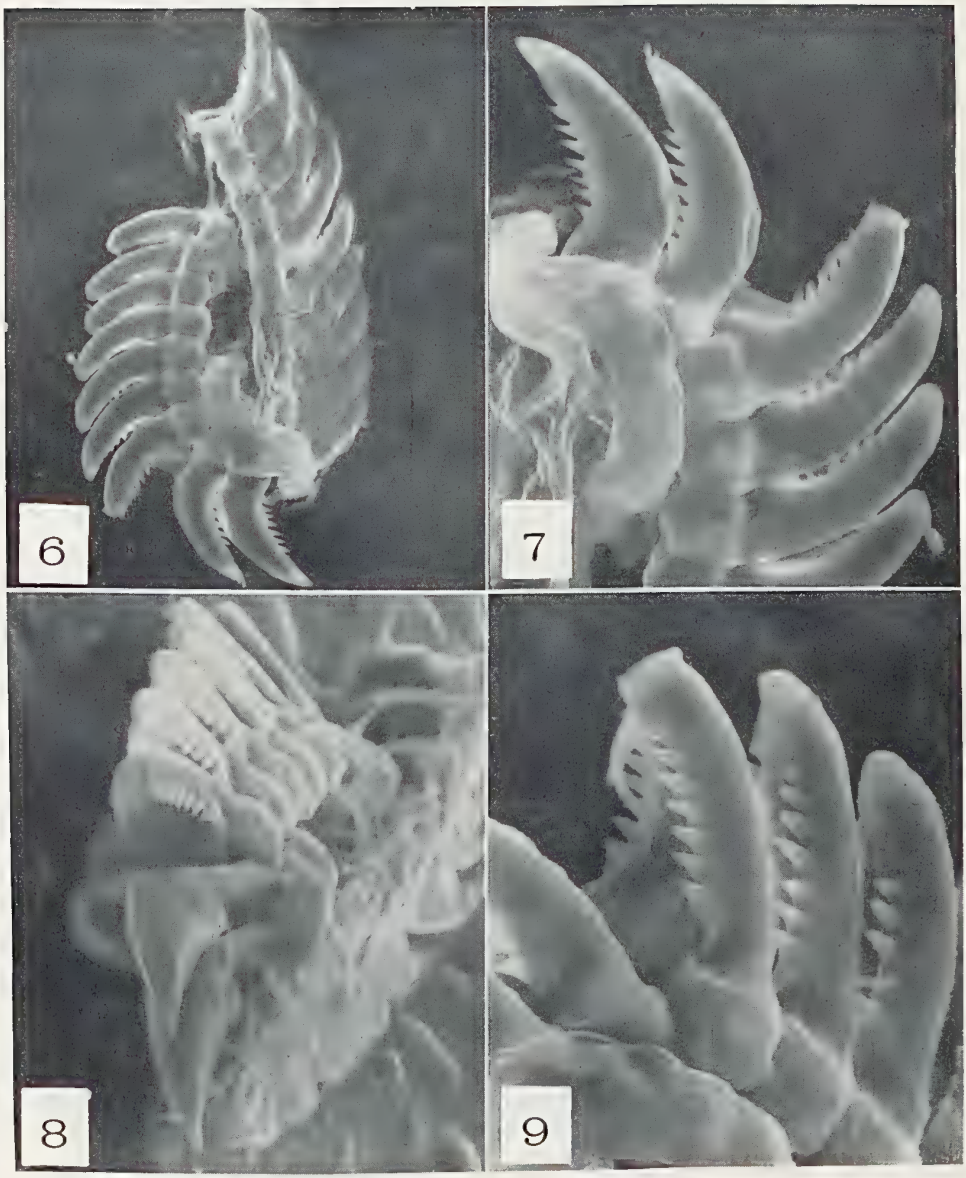
like articulation with the tooth anterior to it. The body of the tooth is extended as an acute, triangular spoon-shaped structure, concave anteriorly. Each side of the tooth bears seven anteriorly pointing small sharply pointed denticles. The pointed tip is easily worn down.

Anatomy: Two specimens were serially sectioned and two were dissected. However, because of the smallness of the specimens, and the fact that none of the specimens were reproductively mature, many of the anatomical features will have to await further collections for elucidation.

The eyes are situated at the outer base of the tentacles. No ctenidia could be detected in the pallial cavity although a long flap-like structure was found attached posteriorly to the left side of the cavity. There also appears to be a structure similar to a pallial tentacle attached at the right margin of the cavity. The anterior part of the reproductive tract extends anteriorly to level with the right side of the buccal mass where it presumably opens to the exterior. A hollow penal organ appears to be present but the specimens were not mature. The oesophagus arises from the mid-dorsal surface of the large buccal mass and runs to the large simple stomach. There appears to be no oesophageal or salivary glands.

Discussion: There is no minute planispiral freshwater operculate remotely similar to this species recorded anywhere in the Australian fauna. The species differs from all other valvatids in its planispiral shell with the two spiral ridges and its radula consisting of a much enlarged central tooth only with no lateral or marginal teeth. A species *Valvata tasmanica* was described by Tenison Woods in 1876. However, it was described as globosely turbinate and was transferred to the Hydrobidae by Iredale 1943 under the genus *Valvatasma*.

The referring of this species to the family Valvatidae constitutes the second record of the family for Australia, and only the third record from the southern hemisphere. This creates considerable zoogeographical problems but these will not be solved by erecting a new family for this species. The species will have to remain an enigma until more collecting can be carried out in Tasmania and comparative collections can be obtained from



Figures 6-9. *Valvata (?) pedderi* sp. nov.

6. X 600.
7. X 2520.
8. X 1848.
9. X 3360.

South America and South Africa, as well as from Europe and North America. Similar species could have been overlooked in remote mountain areas of other parts of the southern hemisphere due to their small size and to lack of collections. This collection was stimulated by the projected hydro-electric work in the area. All the localities where the species was collected are now inundated by a new artificial lake. It is not known what effect this flooding will have on the populations.

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REFERENCES

FRETTER, V. and GRAHAM, A., 1962. *British Prosobranch Molluscs, their functional anatomy and ecology. Ray Society, London.*

IREDALE, T., 1943. A basic list of the freshwater Mollusca of Australia. *Aust. Zool.*, 10(2): 188-230.

TENISON-WOODS, J. E., 1876. Untitled page following Tenison-Woods paper "On the freshwater shells of Tasmania." *Proc. R. Soc. Tas.*, (1875):83.

Post scriptum. Recent correspondence with a worker in Germany indicates a similarity of radulae between this species and an undescribed species from southern Chile. It is felt that both these species, because of the unusual radular structure, should be referred to the family Hydrobiidae, possibly to a new genus. It is hoped to publish further on this in the near future.